Name: _____

VOLTAGE, CURRENT AND RESISTANCE Worksheet

$$\text{resistance} = \frac{\text{potential difference}}{\text{current}}$$

$$R = \frac{V}{I}$$

Units: R is measured in ohms (Ω)
V is measured in volts (V)
I is measured in amperes (A)

1. Solve for the unknown measurement.

a) I = 10 A R = 1500 Ω V = ?	b) I = ? R = 200 Ω V = 240 V	c) I = 15 A R = ? V = 110 V

2. Find the unknown quantity (CONVERT to the base unit FIRST, then solve).

a) I = ? R = 20 Ω V = 350 mV = _____ V	b) R = ? I = 25 mA = _____ A V = 110 V	c) I = 15 A R = 7333 mΩ = _____ Ω V = ?

WORD PROBLEMS → Be sure to check your units before solving the following questions!

3. How much resistance does a light bulb create if it has a current of 25 mA around it in a 9 V circuit?

I = 25 mA = ...

V = ...

R = ?

4. How much current flows through a 16 V battery that has a resistance of 5.1 Ω?

5. The human body offers a very small amount of resistance (let's say 1 mΩ for argument). If a lightning bolt (said to have 1.21 GV of potential according to a famous movie called *Back to the Future* released in 1984) hits you, how much current is flowing through your body? PS. It takes a mere 50 mA of current to kill a human being.

Resistance and Ohm's Law

Complete the following questions using the equation: $V = I \times R$ or $R = V \div I$ or $I = V \div R$

6. What is the potential difference across an electrical load that has a resistance of 4 Ω and a current of 3 A flowing through it?

7. Calculate the current an electric clothes dryer draws when it is connected to a 230 V source ands has a resistance of 9.2 Ω.

8. What is the resistance in a circuit if a potential difference of 110 V causes a current of 10 A?

9. What is the potential difference across a hand-held fan that has a resistance of 120 Ω and a current of 50 mA flowing through it?

10. An electric toaster has a resistance of 12 Ω. What current will it draw from a 120 V supply?

11. a) A portable radio connected to a 9.0 V battery draws a current of 25 A. What is the resistance of the radio?

    b) What type of energy is the electrical energy from the battery being converted into in this device?

12. A heating coil offers a resistance of 2.5 kΩ. What potential difference is required so that 1.5 A of current pass through it?

13. How much resistance does a heavy duty flashlight have if it has a current of 25 mA flowing through it and is being powered by four 1.5 V cells?

Answer Key:

1a. 15000V

1b. 1.2A

1c. 7.33Ω

2a. 0.175A

2b. 4400 Ω

2c. 109.995V

3. 360 Ω

4. 3.14A

5. 1.21×10^{21}A

6. 12V

7. 25A

8. 11 Ω

9. 6V

10. 10A

11a. 0.36 Ω

11b. sound and heat

12. 3750V

13. Vtot = 6V, 0.15 Ω